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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,509	09/25/2003	Magnus Sandell	243124US2CRL	4572

22850 7590 01/25/2006

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EXAMINER	
JACKSON, BLANE J	

ART UNIT	PAPER NUMBER
2685	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/669,509	SANDELL ET AL.	
	Examiner	Art Unit	
	Blane J. Jackson	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *8,11,12,14 and 19-28* is/are allowed.

6)☒ Claim(s) *1,9,10,13,15,18,29,30 and 34* is/are rejected.

7)☒ Claim(s) *2-7,16,17 and 31-33* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 September 2003* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 9, 10 13, 15, 18, 29, 30 and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Mody et al. (US 2002/0181390).

As to claims 1, 9 and 13, Mody teaches an OFDM signal transmitted from an OFDM transmitter using a plurality of transmit antennas (MIMO and OFDM, paragraph 0026), the OFDM signal being adapted for channel estimation for channels associated with the transmit antennas by the inclusion of orthogonal training sequence data in the signal from each antenna (paragraphs 0029, 0037-0039), the training sequence data being derived form substantially orthogonal training sequences of length K for each of the transmit antenna (paragraphs 0040-0043 and 0050), the orthogonal training sequences being constructed such that a minimum required sequence length K needed to determine a channel estimate for at least one channel associated with each transmit antenna is linearly dependent upon the number of the transmit antennas (figures 1-5,

preamble of each frame consists of the number of transmit antenna or more training symbols of length G+N1 samples in time: paragraphs 0047-0052).

As to claim 10, Mody teaches an OFDM data transmission system comprising the transmitter of claim 9 and an OFDM receiver configured to receive the OFDM signal (figure 1, paragraph 0026).

As to claim 15, Mody teaches an OFDM transmitter having a plurality of transmit antennas, the OFDM transmitter being configured to transmit from each of the transmit antenna, training sequence data based upon a training sequence (figures 1-5, paragraphs 0026 and 0037-0041), the training sequences upon which the training sequence data for the antennas is based being constructed such that:

The training sequences are substantially mutually orthogonal (OFDM system: paragraphs 0010 and 0036),

The training sequences allow a receiver to determine a channel estimate for a channel associated with each of the transmit antenna (modulate the respective frames (with training sequence) at specific sub-carrier frequencies and respective transmitting antennas transmit the modulated frames over the channel, paragraphs 0009 and 0029).

As to claim 18 with respect to claim 15, Mody teaches the OFDM transmitter is configured to transmit an OFDM signal with K sub-carriers (paragraph 0029).

As to claim 29, Mody teaches a method of providing an OFDM signal from an OFDM transmitter having a plurality of transmit antennas (MIMO and OFDM, paragraph 0026) with training sequence data for determining a channel estimate for each of the transmit antennas (paragraphs 0029, 0037-0039), the method comprising:

Inserting training sequence data for each transmit antenna into the OFDM signal, the training sequence data being derived from orthogonal training sequences of length K for each antenna (paragraphs 0040-0043 and 0050), the orthogonal training sequences being constructed such that a minimum required sequence length K needed to determine a channel estimate for at least one channel associated with each transmit antenna is linearly dependent upon the number of the transmit antennas (figures 1-5, preamble of each frame consists of the number of transmit antenna or more training symbols of length G+N1 samples in time: paragraphs 0047-0052).

As to claim 30, Mody teaches a method as claimed in claim 29 further comprising retrieving the training sequence data from a training sequence data store (figure 2, selectable training symbols inserted into frames on the channels inherently sourced from data storage, paragraph 0043).

As to claim 34 with respect to claim 29, Mody teaches a data carrier carrying training sequence data for each of the transmit antenna (figure 3, baseband to RF, paragraphs 0044-0048).

Allowable Subject Matter

2. Claims 2-7, 16, 17 and 31-33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to claims 2 and 31, the prior art teaches an OFDM transmitter utilizing a variety of training sequences but does not teach the training sequence identified in the claim.

As to claim 16, the prior art does not teach the training sequence data is based upon scrambled versions of the training sequences.

Claims 8, 11, 12, 14, 19-28 are allowed. As to independent claims 8, 11, 14, 19 and 25, the prior art teaches an OFDM transmitter utilizing a variety of training sequences but does not teach the training sequence identified in the claim.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Larsson (US 2002/0118771) and He et al. (US 2004/0005010)

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blane J. Jackson whose telephone number is (571) 272-7890. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJJ

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